



SHIVAJI UNIVERSITY, KOLHAPUR
(Implemented from June, 2005)

B. E. (Electronics & Telecommunications Engg.) Part-I

Sr. No	Subject	Teaching Scheme				Examination Scheme				
		L	T	P	Total	Paper	TW	POE	OE	Total
1.	Digital Communication	4	-	2	6	100	25	50	-	175
2.	Computer Communication Network	4	-	2	6	100	25	-	25	150
3.	Industrial and Power Electronics	4	-	2	6	100	25	50	-	175
4.	Satellite Communication	3	1	-	4	100	25	-	-	125
5.	Elective – I	3	1	-	4	100	25	-	-	125
6.	Seminar & Project	-	-	4	4	-	50	-	-	50
Total :		18	2	10	30	500	175	100	25	800

B. E. (Electronics Telecommunications Engg.) Part-II

Sr. No	Subject	Teaching Scheme				Examination Scheme				
		L	T	P	Total	Paper	TW	POE	OE	Total
1.	Broadband Communication	4	-	2	6	100	25	-	50	175
2.	Mobile Communication	4	1	-	5	100	25	-	-	125
3.	Audio – Video Engg.	4	-	2	6	100	25	-	50	175
4.	Elective – II	4	1	-	5	100	25	-	-	125
5.	Project	-	-	8	8	-	100	-	100	200
Total :		16	2	12	30	400	200	-	200	800

Elective – I

- 5.1) VLSI Technology
- 5.2) Image Processing
- 5.3) Fuzzy logic

Elective – II

- 4,1) Digital Signal Processors
- 4,2) Embedded Systems
- 4.3) Pattern Recognition



SHIVAJI UNIVERSITY, KOLHAPUR

(Implemented from June, 2005)
B.E.(Electronics and Telecommunication) Part- I

1. Subject : Digital Communication

Lectures: 4 Hrs/Week
Practical: 2 Hrs/Week

Theory: 100 Marks
TW : 25 Marks
POE : 50 Marks

Section – I

- 1) Random Signal Theory :** (6)
Probability, joint & conditional probability, probability mass functions, statistical average, continuous random variables – PDF and statistical averages, random processes- stationarity, time average & ergodicity, power spectral density of stationary random processes
- 2) Information & Channel Capacity :** (8)
Measure of information, Entropy, Information Rate, Shannon's encoding theorem, Communication channels – discrete & continuous, Rate of information transmission over a discrete channel, capacity of a discrete channel, Shannon- Hertly theorem for continuous channels, Implementation of Shannon's theorem , Huffman's coding technique
- 3) Waveform Coding:** (6)
Quantization – Uniform & Non uniform , Differential , PCM, ADPCM system, Bandwidth requirement, Noise in PCM , TDM-PCM Telephone system , PCM Vs. Analog modulation, Power bandwidth exchange, DPCM system, Delta Modulation – Noise in DM , Comparison with PCM, Q level DPCM system, ADM, CVSD.
- 4) Baseband Data Transmission :** (5)
Baseband pulse shaping , Duobinary & M-ary signaling , Shaping of transmitted spectrum , Effect of precoding , Pulse shaping by Digital Methods , Equalization , Eye Diagrams , Synchronization , Scrambler, Scrambler, ISI.

Section – II

- 5) Digital Carrier Modulation Schemes :** (5)
Binary ASK , PSK , FSK schemes , Probability of error , Coherent PSK & FSK, Differential coherent PSK, Non coherent FSK, Comparison of digital modulation schemes–Bandwidth & power requirements, Equipment complexity , M-ary signaling schemes – M-ary coherent PSK , M-ary differential PSK , M-ary wideband FSK , Synchronization methods,QAM.

6) Optimum Receiver for Digital Modulation : (6)

Probability of error, Matched filter receiver, Correlation receiver, Synchronization, Symbol Synchronization, Frame synchronization, Carrier recovery circuits.

7) Error Control Coding : (12)

Types of error & codes, Linear Block Codes - Error Detection & Correction, Hamming codes, Table Lookup Decoding, Binary cyclic codes – Algebraic Structure, Encoding using (n-k) bit shift register, Syndrome Calculation, BCH code, Burst error & Random error correcting codes, Convolutional codes – Encoders & Decoders, Performance of block codes – error correction & detection.

Text & References :

K.Sam Shanmugam : - Digital & analog Communications (John Wiley)
 Siman Haykin :- Digital Communication (Wiley)
 B.P. Lathi :- Modern Digital & Analog Communication System (Oxford)
 Digital Communication Fundamentals & Applications :- Bernard Scalar.

EXPERIMENT LIST :

1. Study of PCM –TDM.
2. Study of Compander.
3. Study of DPCM.
4. Study of ADPCM.
5. Study of DM .
6. Study of ADM.
7. Study of CVSD.
8. Study of ASK, FSK & PSK.
9. Study of QPSK.
10. Measurement of bit error rate.
11. Study of Hamming Code.
12. Study of generation of cyclic codes .
13. Study of Eye Diagram using oscilloscope
14. Study of any digital modulation scheme using Matlab communication tool
15. Matlab practicals on random signals (Study of Continuous Random Variable- probability vs variance)

B.E.(Electronics and Telecommunication) Part- I
2. Subject : Computer Communication Network

Lectures : 4 hrs / week
Practical : 2 hrs / week

Theory : 100 Marks
TW : 25 Marks
OE : 25 Marks

SECTION – I

- 1) **Introduction to computer networks** – need, applications, line configurations, topology, categories of networks and internetworks. Layered reference model – need of layers, design issues of layers, ISO-OSI Model. - (5)
- 2) **Physical Layer** –Transmission media :– Guided media-twisted pair, coaxial cable, optical fiber. Unguided media – RF allocation, terrestrial microwave, satellite communication, cellular telephone.
 –Design issues for physical layer, EIA 232 D interface standard, Modems – types, block schematic. - (5)
- 3) **Data Link Layer** – design issues, error detection and correction, elementary data link protocols, sliding window protocols.
HDLC – types of stations, modes of operation, HDLC frame formats, additional features.
 (7)
- 4) **Medium Access Sublayer** – Channel allocation problem, multiple access protocols. (4)

SECTION – II

- 5) IEEE standard 802 for LANs and WANs, bridges, high speed LANs. (6)
- 6) **Network Layer** – Design issues, Routing algorithms – shortest path, distance vector routing, link state routing, flow based routing, routing for mobile hosts, Congestion control – congestion prevention policies-leaky bucket algorithm, token bucket algorithm, congestion control in virtual circuit subnet and choke packets. (6)
- 7) **TCP/IP Protocol Suit Overview** – TCP/IP versus OSI model, TCP/IP and Internet, IP protocol and it's header format, addressing, subnetting, other network layer protocols – ARP, RARP, ICMP, IGMP. (6)
- 8) **Transport Layer** – TCP and it's header format, congestion control in TCP, UDP, Domain name system (DNS). (5)

Ref :

1. Chapters 1, 2 : Data Communication and Networking Forouzan-IInd edition
2. Chapter 3 : Data Communication P.C. Gupta
- 3.Chapters 3 to 8 : Computer Networks Tanenbaum

Note: Any 10 experiments based on above syllabus preferably including following:

1. Installation of any one of the network operating systems.
2. Study of LAN.
3. File transfer.

B.E.(Electronics and Telecommunication) Part- I
3. Subject : Industrial & Power Electronics.

Lectures: 4 Hrs/week
 Practicals: 2 Hrs/week

Theory: 100 marks.
 TW : 25 marks
 POE: 50 marks

Section-I

1. **Semiconductor Power Devices: -** (07)
 Characteristics of power diodes, power transistors, power MOSFET, IGBT, SCRs, TRIACs, DIAC and GTO. Rating of power devices, series and parallel connections of SCRs, SCR protections- dv/dt , di/dt , over voltage and over current protection,
2. **Turn ON and Turn OFF Circuits: -** (05)
Turn ON Methods- study of single phase firing circuits using UJT, PUT, **Turn OFF Methods-** Forced commutation circuits- Parallel Capacitance, resonant turn off, external pulse commutation, auxillary thyristors and load commutation. (Class A to F)
3. **Applications of Thyristors: -** (03)
 Static circuit breakers, over voltage protectors, zero voltage switch, integral cycle triggering, time delay method, soft start method.
4. **Controlled Rectifier Circuits: -** (09)
 - a) **Single Phase: -** Half wave, full wave, half controlled and full controlled converters with R & RL Load, effect of Freewheeling Diode. Calculations of performance parameters expected.
 - b) **Three Phase: -** Half wave, full wave, fully controlled converters with Resistive Load only.

Section-II

5. **SCR Choppers: -** (05)
 Introduction to DC-to-DC converters, Basic chopper circuits, Voltage control methods- Jones chopper, Morgan's chopper, Introduction to multiphase choppers. Step up chopper.
6. **SCR Inverters: -** (07)
 Voltage driven and Current driven Inverters, single phase center tapped inverter circuit, single phase bridge inverters, Macmurray and Macmurray-Bedford inverter circuits, principle of operation of three phase inverters, Voltage control techniques, harmonic elimination methods (Analytical treatment not expected).

7. AC and DC Drives: - (06)

- a) **DC Motor control-** using single phase bridge converters, dual converters and choppers
- b) **3-phase AC motor control-** Introduction to cycloconverters, speed control of Induction Motor using cycloconverter and Inverter, operation of cycloconverter.

8. Miscellaneous applications: - (06)

Non-drive applications such as induction heating and Dielectric heating, Switched mode power supply (SMPS), Uninterrupted power supply (UPS), Industrial Ultrasonic- generators, detectors and applications.

Text Books: -

P.C.Sen: Power electronics ; TMH
Chute and Chute: Electronics in industry; MGH
General Electric: SCR manual, PH
Ned Mohan: Power electronics; John Willey Pub.

Experiment List: -

Minimum 8 experiments out of following-

- 1. 3 experiments on Topic 1 & 2
- 2. 2 experiments on Topic 4
- 3. 3 experiments on Topic 5 & 6
- 4. 3 experiments on Topic 3, 7 & 8

SHIVAJI UNIVERSITY, KOLHAPUR
B.E.(Electronics and Telecommunication) Part- I
4. Subject : Satellite Communication

Lectures: 3 Hrs/Week
 Tutorial: 1 Hrs/Week

Theory: 100 Marks
 TW : 25 Marks

Section – I

- 1. Introduction:** (3)
 History, Overview : Satellite Communication in 2000.
- 2. Orbital Mechanics and Launchers** (5)
 Orbital Mechanics, Look angle determination, Orbital perturbations, Orbital determination, Launchers and Launch Vehicles, Orbital effects in communication system performance.
- 3. Satellites:** (7)
 Satellite Subsystems, Attitude and control systems (AOCS), Telemetry, Tracking, Command and Monitoring, Power systems, Communication subsystems, Satellite antennas, Equipment reliability and space qualification.
- 4. Satellite Link Design:** (7)
 Introduction, Basic transmission Theory, System Noise Temperature and G/T Ratio, Design of Downlinks, Satellite Systems using Small Earth Stations, Uplink Design, Design of Specified C/N : Combining C/N and C/I values in Satellite Links, System Design Examples

Section - II

- 5. Multiple Access:** (6)
 Introduction : TDMA, FDMA, CDMA
- 6. VSAT System:** (3)
 Introduction, Overview of VSAT Systems, Network Architecture VSAT Earth Station Engineering
- 7. Low Earth Orbit and Non-Geo-Stationary Satellite Systems :** (9)
 Introduction , Orbit considerations, Coverage and frequency Consideration, Delay and Throughput consideration, Operational NGSO constellation design: Iridium, Teledesic
- 8. Direct Broadcast Satellite Television And Radio:** (2)
 C- Band and Ku- Band, Home Satellite TV, Digital DBS TV, Satellite Radio Broadcasting
- 9. Satellite Navigation and the Global Positioning System:** (2)
 Introduction, Radio and Satellite Navigation, GPS Position Location Principles, GPS Recivers and codes.

Text Books:

- Satellite Communications – Timothy Pratt, Charles Bostian, Jeremy Allnut
 John Wiley & Sons (II Edition)

Reference Books:

- Satellite Communications – Dennis Roody
 McGraw Hill

Note : Students, as a part of their term work, should visit satellite earth station and submit a report of visit.

SHIVAJI UNIVERSITY, KOLHAPUR
B.E.(Electronics and Telecommunication) Part- I
5.1 Subject : Elective-I (VLSI Technology)

Lectures : 3 hrs / week
Tutorial:1Hr/week

Theory : 100 Marks
TW : 25 Marks

Section – I

1.Digital Design:

Characteristics (Power dissipation ,Noise margin ,Fan in, Fan out) , Single channel MOS inverter, CMOS inverters, CMOS gates, Transmission gates , Delays and loading consideration. (5)

2.Finite State Machines:

Sequential and combitional circuit design , Moore and Mealy machine, Design examples using PLD's- Barrel shifter ,Synchronous controllers, Timing considerations. (7)

3.Architecture of VLSI processors:

CPLD and FPGA, ARM/SPARTAN, The architecture of above in Xilinx and Altera with specifications, block diagram and their comparison. Multiplex & demultiplex keyboard and display interface. (7)

Section-II

4.VHDL: (9)

Introduction, entity, architechure , configuration/behaviour, package declaration, data objects, data types, operators, attributes.

Statements: process, variable ,signal ,wait ,if_then, when, null,next,exit.

Overloading , VHDL code for various sequential , combinational circuit , state machines. Multiplexed and non multiplexed keyboard and display interface.

5.EDA Tools: (8)

Information on a complete tool from design entry to place and route with optimisation considerations,.

Information to EDA tools for simulation and synthesis, Design of Test bench.

6. Study of download facility to CPLD/FPGA, Physical verification and checking. (3)

Term work:

1. Combinational design using structural and behavioural modeling.

2. Sequential design considering clock aspect.

3. Simulation and synthesis of state machine.

4. Downloading of combinational and sequential circuit for CPLD or FPGA.

At least two programs of each above.

Text book:

1. VLSI Design Techniques for analog and digital circuits

Randall L. Geiger ,Phillip E. Allen, Noel R.Strader

2. VHDL primer ,J.Bhasker.

3. Digital Design- principles and practices ,Wakerly .

4. VHDL Analysis and Modelling of digital systems , Navabi.

5. Xilinx manual

SHIVAJI UNIVERSITY, KOLHAPUR
B.E.(Electronics and Telecommunication) Part- I
5.2 Subject : Elective-I (Image Processing)

Lectures : 3 hrs / week
Tutorial:1Hr/week

Theory : 100 Marks
TW : 25 Marks

Section – I

1. Image processing fundamentals : Fundamental steps in image representation, image sampling, quantization, Gray scale image, colour image fundamentals, colour transformations. [6]
2. Image transforms: Two dimensional orthogonal and unitary transforms, DFT, FFT, DCT, Harr, KLT. wavelets. [8]
3. Image enhancement : filters in spatial and frequency domain, Histogram based processing, ponomorphic filtering. [6]

Section – II

4. Mathematical Morphology : Binary morphology, dilation erosion, opening & closing, hit and miss transforms thinning. [5]
5. Image restoration : A model of image restoration /restoration process, noise models, restoration in the presence of noise. Periodic noise reduction by frequency domain filtering, estimating the degradation function, Inverse filtering weiner filtering constrained least square filtering. [6]
6. Image Analysis : Spatial feature extraction – Edge detection Gradiest, compass & laplace operators, line & sport detation, Boundary extraction – connectivity, contour following , enge linking & heuristic graph searching, Boundary representation – chain codes, B spline, region representation, segmentation. [8]

Text : 1) A.K. Jain, fundamentals of digital image processing pearson education PHI 2001.
 2) W.K. Pratt. Digital image processing. Prentice hall.
 3) Rafael C. Gonzalez & Rich and E Woods, digital image processing pearson education 2001.

Reference :

B Charda & D Datta. Mujumdar Digital image processing & Analysis pHI 2003.

SHIVAJI UNIVERSITY, KOLHAPUR

B.E.(Electronics and Telecommunication) Part- I

5.3 Subject : Elective- I (Fuzzy Logic)

Lectures: 3 Hrs/Week

Tutorial: 1 Hrs/Week

Theory: 100 Marks

TW : 25 Marks

Section – I

- 1.Introduction to fuzzy set theory:** (6)
 Probabilistic reasoning , Fuzzy sets, mathematics of fuzzy set theory, operations on fuzzy sets , comparison of fuzzy and crisp set theory.
- 2.Fuzzy mapping:** (6)
 one to one mapping ,max-min principle ,extension principle, implication rules – mamdani implications.
- 3.Membership functions:** (7)
 Universe of discourse , mapping inside fuzzy domain , fuzzy membership mapping methods , application to real world problems.

Section –II

- 4.Fuzzy knowledge based systems:** (6)
 Fuzzification ,Fuzzy knowledge base ,rule base ,Data base for fuzzy , Inference rules , defuzzification methods of defuzzification.
- 5.Fuzzy controller:** (5)
 Control strategies , general PID controller ,Implementation of fuzzy systems in control ,Direct fuzzy controller ,Fuzzy P , PI and PID controller , Indirect fuzzy controller – fuzzy in handling the inner loops of control systems.
- 6.Nonlinear systems and adaptive fuzzy controller:** (5)
 Nonlinear systems , modification in fuzzy systems for nonlinear control ,Adaptive control , Adaptive control using fuzzy ,fuzzy sliding mode controls.
- 7.Hybrid systems:** (4)
 Neuro- fuzzy and fuzzy genetic systems ,applications to engineering problems.

Reference books:

1. Fuzzy logic to engineering applications –Timothy J. Ross.
2. Fuzzy control –Drianlcov.
3. Fuzzy modeling and control –Yager.

SHIVAJI UNIVERSITY, KOLHAPUR
B.E.(Electronics and Telecommunication) Part- I
6. Subject : Seminar and Project

Teaching scheme :
Practical 4 hours / week

Examination Scheme
Term work : 50 Marks

- 1) Project group should consist of students not more than 5 students.
- 2) All the students in the group should deliver seminars and at least one student from the group should deliver seminar based on project.
- 3) The group should submit a synopsis of the project to the department and a report based on seminars.
- 4) A group should complete the design of project in this semester.
- 5) The term work marks should be based on performance in seminar delivered and preparation of project work completed.

SHIVAJI UNIVERSITY, KOLHAPUR**B.E.(Electronics and Telecommunication) Part- II****1. Subject : Broadband Communication****REVISED SYLLABUS**

Lectures : 4 hrs / week

Practical : 2 hrs / week

Theory : 100 Marks

TW : 25 Marks

OE : 50 Marks

SECTION – I

1. X.25, Frame relay ,X.25 v/s Frame relaying, Frame mode protocol architecture, Frame relay and Frame switching, Frame mode call control , Call control protocol, DLCI, Bearer capability, Link layer core parameters, LAPF. - (6)
2. ISDN – Integration of Transmission and Switching, Analog and Digital switching, Principles of ISDN, User interface, Architecture, ISDN standards, I-series recommendations. (7)
3. ISDN : interface and Functions – Transmission structure, User network interface, ISDN protocol architecture, ISDN connections, Addressing, Interworking, B-ISDN architecture and standards - (8)

SECTION – II

4. **B-ISDN Services** – Conversational, Messaging, Retrieval, Distribution, Business and Residential requirements. - (4)
5. **B-ISDN protocols** – User plane, Control plane, Physical layer, Line coding, Transmission structure, SONET- Requirement, Signal Hierarchy, System Hierarchy. - (6)
6. **ATM** – Overview, Virtual channels, Virtual paths, VP and VC switching, ATM cells, Header format, Generic flow control, Header error control, Transmission of ATM cells, Adaptation layer, AAL services and protocols. - (7)
7. **ATM switching** – ATM switching building blocks, ATM cell processing in a switch, Matrix type switch, Input, Output buffering, Central buffering, Performance aspects of buffering switching networks. - (6)

Ref :

1. ISDN and Broadband ISDN with Frame Relay and ATM
William Stallings, Prentice-Hall, 4th edition
2. Broadband Communications
Balajikumar, Mac-Graw Hill

Note: Term work should consist of minimum eight experiments / tutorials based on above syllabus.

SHIVAJI UNIVERSITY, KOLHAPUR
B.E.(Electronics and Telecommunication) Part- II
2. Subject : Mobile Communication

Lectures: 4 Hrs/Week
 Tutorial: 1 Hrs/Week

Theory: 100 Marks
 TW : 25 Marks

Section – I

1. Introduction to Mobile Communication:

Mobile and Personal Communication, Wireless Communication, Need and Application of Wireless Communication, Wireless data technologies, mobile and wireless devices (7)

2. Cellular concepts:

The cellular concept, multiple access technologies for cellular systems, cellular system operation and planning (6)

3. Digital cellular mobile systems:

GSM: The European TDMA digital cellular standards, IS –95-The North America CDMA digital cellular standards (5)

4. Mobile Data Communication:

Introduction, Specialized packet and mobile radio networks, circuit switched data services on cellular networks, packet switched data services on cellular networks. (6)

Section-II

5. Wireless LAN:

Introduction, Infrared radio transmission infrastructure and ad_hoc networks, IEEE 802.11, HIPER LAN, Blue_tooth (6)

6. Wireless ATM:

WATM services, Reference Model, Functions, Radio access Layer, handover, Location management, Addressing, Mobile QOS, Access point control protocol (6)

7. Mobile Network Layer:

Mobile IP, DHCP (Dynamic Host Control Protocol) (5)

8. Mobile Transport Layer:

Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast and Selective retransmission and recovery, Transaction oriented TCP (7)

Text Book:

1. Mobile Communications: Jachen Schiller (Addison Westy)

Reference Book:

1. Mobile and Personal Communication systems and services : Raj Pandya (PHI)

SHIVAJI UNIVERSITY, KOLHAPUR
B.E.(Electronics and Telecommunication) Part- II

3. Subject : Audio - Video Engineering

Lectures: 4 Hrs/week
 Practicals: 2 Hrs/week

Theory: 100 marks.
 TW: 25 marks
 OE: 50 marks

Section I

1) Principle of disc recording, Principle of disc reproduction, Block diagram of disc reproduction system, Coarse- grooves and micro grooves, construction of cutter stylus, Play back needles, cartridges or pick up units, Principle of magnetic recording and reproduction, Recorded wavelength, Gap-width and tape speed, need for biasing, DC & AC biasing, Parts of tape recorder, tape transport mechanism advantages and disadvantages of tape recording, Block diagram tape recording and reproducing system Wow and flutter distortions, Rumble, Hissing noise, Types of optical recording of sound, Methods of optical recording of sound on films [7]

2) Multimedia Definition, Elements of multimedia system, Need of multimedia Audio applications, audio capture, compression, standards Video applications, video capture, Television, compression, standards, Proprietary compression [6]

3) Introduction to video systems, Sound and picture transmission, scanning process, Camera pick up devices, camcoder, Video signal, aspect ratio, horizontal and vertical resolution, video bandwidth and interlaced scanning, Composite video signal for monochrome TV video signal standards, sound and video modulation, VSB transmission and reception (CCIR-B standards), composite colour signals, compatibility, TV transmitter block diagrams [6]

Section II

5) Colour TV systems, elements of NTSC colour system, Basic colour TV transmitters, (NTSC and PAL), basic parameters of SECAM system, SECAM coder and decoder, Line by line switch and colour identification circuit, delay line, basic features of PAL system, PAL coder and decoder, colourpixed video signal (PAL). [6]

6) Colour TV receivers, antenna, RF tuner, AFT, Video IF amplifier, video detector sound section, first video amplifier delay line colour burst circuit, AGC amplifier, phase discriminator, phase identification amplifier and colour killer, reference oscillator, vertical deflection system, horizontal deflection system, EHT [6]

7) Composite colour signal introduction, colour spectrum, compatibility considerations, chromaticity diagram, colour TV signal, luminance signal, chrominance signal, recombination to natural colour voltages, interleaving process, colour subcarrier frequency, colour picture tube, shadow mask, gun assembly, in-line guns, precision in line colour picture tube, colour picture tube requirements, degaussing, purity convergence, convergence circuits, colour receivers set up procedure, troubles in colour picture tube. [7]

8) High definition TV, satellite TV, cable TV, working of block converter, Introduction to digital television, how digital television works, Remote control [6]

Ref. Books :

- 1) Multimedia in practice Technology & Applications -Judith Jeffcoate (PHI)
- 2) Audio-video Engineering-Gupta
- 3) Television and Video Engineering- A. M. Dhake
- 4) Colour television Theory and practice- R.R. Gulati
- 5) Basic Television and Video systems-Bernord Grob
- 6) Communication Electronics- Frenzel
- 7) Electronic Communication Systems-George Kennedy

SHIVAJI UNIVERSITY, KOLHAPUR**B.E.(Electronics and Telecommunication) Part- II****4.1 Subject : Elective- II (Digital Signal Processor)**

Lectures: 4 Hrs/Week
 Tutorial: 1 Hrs/Week

Theory: 100 Marks
 TW : 25 Marks

Section – I

- 1. Introduction to Digital Signal Processors:** (6)
 Architecture overview, DSP family, TMS320xx6711 series, ADSP 21xx, General Description and key features of DSP family.
2. Functional Block Diagram, Internal Hardware, Memory Quantization, Central Arithmetic Logic Unit, system control, Input – output function, Interrupts, Serial ports etc for above TMS and ADSP series (6)
3. Assembly language introductions, Memory addressing modes, Instruction set for above TMS and ADSP series.
- 4. Software Applications:** (6)
 Process initialization, Interrupt management, Process control, memory management, Logical and arithmetic operation.

Section – II

- 5. ADSP family :**
 Analog 21061 series share block diagram, Interrupt Hardware, memory quantization, central arithmetic logic unit, system control etc. (6)
- 6. Assembly language programming of Analog 21061 series:**
 Introduction , memory addressing modes, instruction set.
 Software applications – Process initialization , interrupts etc. (6)
- 7. Applications :**
 FIR/IIR filtering , Adaptive filtering , FFT Analysis , PID Controller , Spectral Analysis etc.
 (6)
- 8. VLSI – DSP :**
 Introduction to VLSI and DSP , aspects of program. (6)

Reference books:

1. Programming with DSP processors – Texas Instruments.
2. Digital Signal Processors – Venkataramani / Bhaskar.
3. Digital Signal Processing and VLSI – Parih.

SHIVAJI UNIVERSITY, KOLHAPUR
B.E.(Electronics and Telecommunication) Part- II
4.2 Subject : Elective-II (Embedded Systems)

Lectures : 4 hrs / week
Tutorial:1Hr/week

Theory : 100 Marks
TW : 25 Marks

Section – I

1.CPU Architecture and Programming: (15)
 Embedded System Revolution, ARM Controller, architecture, addressing mode, Instruction Set. Special features – Analog DSP controllers Texas

2. Embedded software: (10)
 Examples of embedded system, their characteristics and their typical hardware components, embedded software architectures, round robin, round robin with interrupts, function queue scheduling and real time operating system, selection. Real time operating system: Tasks and task states, tasks and date shared data and reentrancy, semaphores and shared data use of semaphores, protecting shared data.

Section II

3. Features of Real Time Operating System: (12)
 Messages, queues, mailboxes and paper, timer function, events, memory management, interrupt basic system design using an RT (OS design principles, interrupt routines, task structures and priority.)

4. Examples of and embedded system design: (12)
 Problem specification, resolving timing problem, use of an RTOS, work division into tasks dealing with shared data, encapsulating semaphores and queues, saving space and power.

Text Books :

1. An Embedded Software Primer, David E. Simon
 Pearson Education Asia Publication
2. Embedded microcontrollers and Processors Maual Intel Corporation

SHIVAJI UNIVERSITY, KOLHAPUR
B.E.(Electronics and Telecommunication) Part- II
4.3 Subject : Elective-II (Pattern Recognition)

Lectures : 4 hrs / week
Tutorial:1Hr/week

Theory : 100 Marks
TW : 25 Marks

Section – I

1. Introduction :- **[03]**

Application of pattern recognition, statistical decision theory.

2 .Probability :- **[07]**

Moments of random variables, estimation of parameters from samples, minimum risk estimators.

3. Statistical decision making :- **[08]**

Introduction, Bay's theorem, multiple features, conditionally independent features, decision boundaries, unequal cost of error, estimation of error rates, the leaving one-out technique, characteristic curves, estimating the composition of population.

4. Non parametric decision making :- **[08]**

Introduction, histograms, kernel and window estimators, nearest neighbour classification techniques, adaptive decision boundaries, adaptive discriminate functions, minimum squared error discriminant functions, choosing a decision technique.

Section – II

5. Clustering :- **[08]**

Introduction, hierachecal clustering :- single linkage, complete linkage, Average linkage, Algorithms, wards method. Partitional clustering : - Forgy's, K means, Isodata algorithm.

6. Object Recognition :- **[07]**

Knowledge representation, statistical pattern recognition, Neural Nets:- feed forward network, unsupervised learning, hopefield neural net, Syntactic pattern recognition, fuzzy Optimization technique in recognition :- genetic algorithm, simulated ananealing.

7. Case Studies :- **[07]**

Optical Music recognition system, automated identification of airway trees, automated image analysis in cardiology.

Text :

- 1) Earl Gose Richard Johnsonbangh & steve Jost patern recognition & image Analysis prestice Hall India – 2003.
- 2) Pattern recognition principles.
J.T.Toy, R.C. Gonzalez, (Addison Wesley)
- 3) Image processing Analysis & machine vision. Milan sonka, Vaclav Hlavac, Roger

Boyle.

SHIVAJI UNIVERSITY, KOLHAPUR
B.E.(Electronics and Telecommunication) Part- II

5. Subject : Project
REVISED SYLLABUS

Teaching Scheme :
Practical : 8 Hours / Week

Examination Scheme
Term Work : 100 Marks
Oral Examination: 100 Marks

A project group should complete the project and working model of Hardware / Software (as applicable) should be submitted to the Department at the end of semester.

The project group should submit a report based on project work done by them including result analysis of the work done along with synopsis.

SAWANT S. P.

BIRJE SR/ Jc.

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